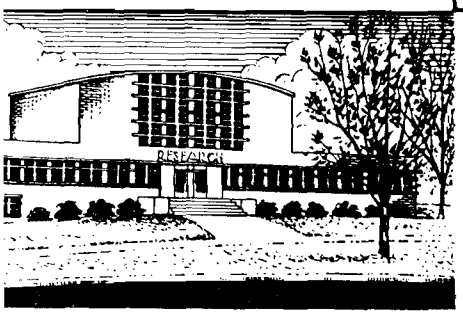
Project B-166-7

CUSTOM DIE CASTING
An Industrial Possibility for Georgia

Prepared for
The Georgia Department of Commerce
Abit Massey, Director

by
Ben W. Carmichael



Engineering Experiment Station
Georgia Institute of Technology
Atlanta, Georgia

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Foreword

Die casting is one of many manufacturing operations which can advantageously locate in small communities. Since most shipments would be by truck, it is not necessary to locate near a rail center. The need for a site where noise and smoke will not bother nearby residential or industrial areas makes our less populated areas naturally attractive. The fact that a rural area can furnish lower cost but readily trainable labor also is advantageous. For many firms and workers, such a location also provides more attractive living conditions than do larger cities.

A die casting plant located in a rural area will, of course, need tool and die facilities of its own, unless one of the several rural Georgia areas which now can provide limited tool and die operations is selected.

Local development groups interested in applying the findings of this study to their particular circumstances are invited to contact the Georgia Department of Commerce or the Industrial Development Branch for assistance.

Industrialists interested in a branch operation or in a possible relocation of their existing die casting facilities may require additional information to define a specific market of interest to them. Questions regarding such special requirements may be directed either to the Department of Commerce or the Industrial Development Branch.

Kenneth C. Wagner, Head
Industrial Development Branch

Acknowledgments

Responses to two separate questionnaires were most gratifying and made possible the evaluation of the area market presented here. To those who answered the questionnaires we are greatly indebted.

Mr. David Laine, Secretary, American Die Casting Institute, provided national data on die castings production and made some helpful comments.

Mr. James McDonald and Mr. Richard Whitehead of Whitehead Die Casting Company in Atlanta have given aid in interpretating the language of die casting for the author.

Other help was obtained through talks and correspondence with suppliers of metals, machines and other equipment and with several die casting producers and users. Thanks is due to each.

Summary

This report defines the existing potential for a custom or job shop die castings producer in a six state area composed of Georgia and the surrounding five states. A custom die casting market of at least $5 million has been determined in this area. At present, although there are several excellent die casting concerns, there is no large integrated supplier in the area to serve this market. It is estimated that better than 60 per cent of the custom die castings are produced outside the area.

The industry is going through a great expansion on a national scale. Much of this growth will likely take place in newly industrialized areas such as Georgia in order to take advantage of new markets that are developing. Favorable labor conditions, climate, and other factors making for efficient operation also encourage new plants in these areas.

From this study of the market potential in the six southeastern states of Georgia, Florida, Alabama, North Carolina, South Carolina, and Tennessee, a projection of possible consumption in the area to 1965 was calculated.

A lower proportion of industry in this area than in the nation as a whole can be considered castings consuming industries. This presents both a deficit and an opportunity. The die casting industry is growing more actively in the area than in the nation as a whole.

The American Die Casting Institute indicated that in 1957 there were 22 captive and 12 job shop plants, a total of 34 in the six state area. Yet the majority of these plants do not have all the facilities necessary to furnish the quality work and services needed. This is evidenced by the import of a large portion of custom die castings used in the area from distant producers.

A well equipped plant offering design and engineering services, and with the ability to produce high quality die castings at efficient production rates would be a great asset to the area and should find a ready market for its output.

INTRODUCTION

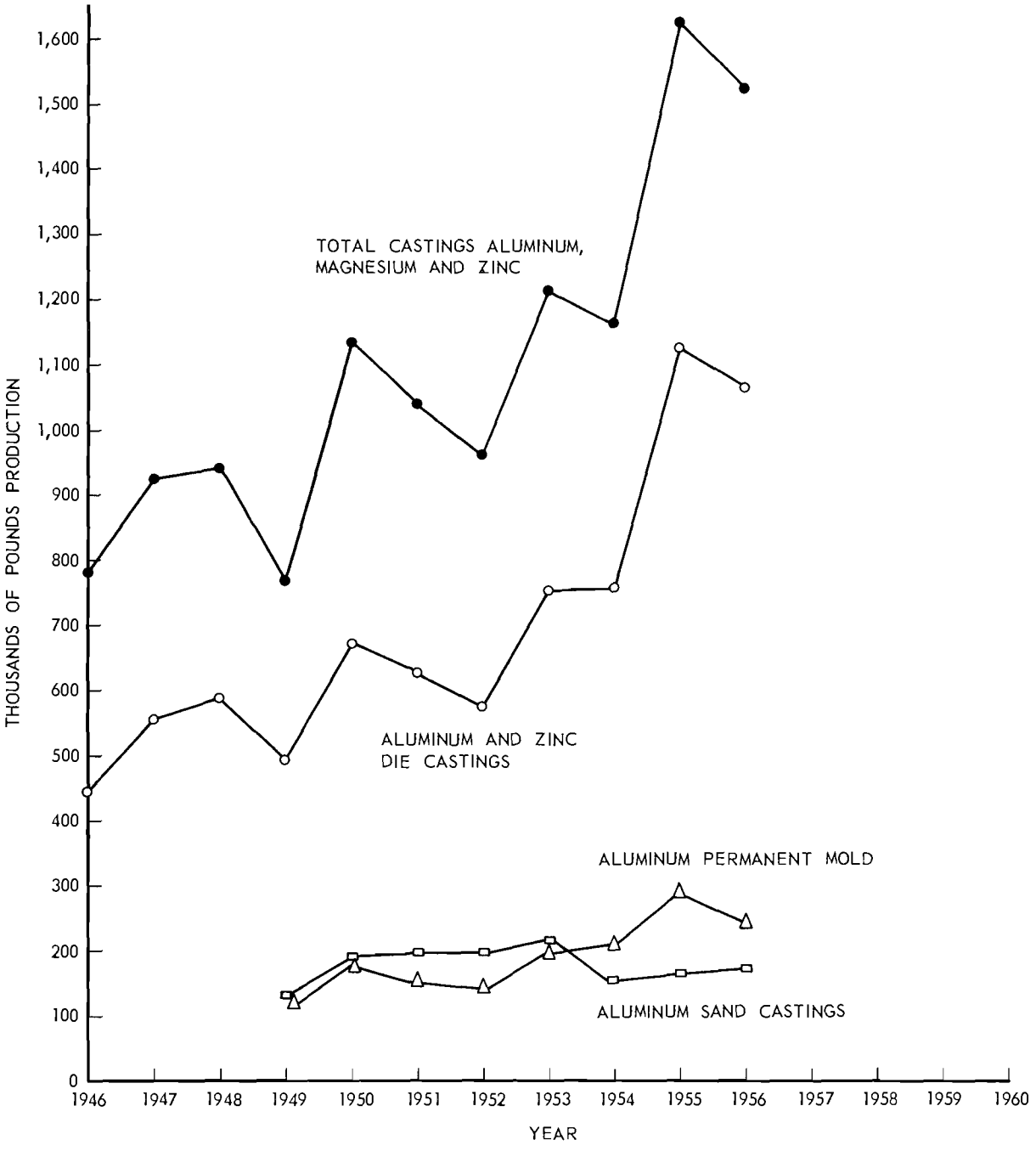
As Georgia's metalworking industry grows, opportunities develop for the suppliers of parts and services. Die casting is an industry which produces basic items needed by many assembly plants. Thus the presence of more die casting facilities in the area will breed additional industries as well as fill the gap in the needs of existing industries. The ability of the die casting process to produce intricate parts at high rates of production places the die casting producer in the position to strengthen the other industries in the area by making this efficient low cost method available to them.

Maximum industrialization of the area is favored by the presence of facilities and services that are highly automated and mechanized. Through this connection the growth of an industry such as die casting is vital.

This report establishes and describes the need for die casting, particularly custom casting facilities in Georgia and the surrounding states. Increased population concentration develops markets, both for consumer goods and for industrial products, needed by the manufacturers that assemble and produce the consumer goods. Die casting concerns can supply both these markets. Parts for the automotive and aircraft and missile assembly plants now in the area comprise a ready market for industrial die castings. Local producers of power lawn mowers, tape recorders, fans, aluminum windows, small power tools, and other consumer goods need suppliers of die castings close by. Die casting facilities now existing in the Southeast will not be sufficient as these needs develop. There is at present no large, well integrated die casting facility located in the six state area comprised of Georgia and the surrounding states.

In order to give a background for definition of the need for die casting facilities in this given area, the national trends in light metal castings production were first evaluated. A more detailed analysis of the area market was then made.

FIGURE 1
LIGHT METAL CASTING PRODUCTION



I. THE NATIONAL MARKET

The metalworking industry has over the years depended on castings as a cheap, versatile method of manufacturing many items. Gray iron will probably for a long time to come have the tonnage volume market because of its low cost and consequent use in large castings. The relative position of metals used in casting has remained about the same over the past 15 or 20 years. Gray iron comprised 76.6 per cent of the total tonnage in 1956, followed by steel (10.7), malleable iron (5.3), copper base alloys (2.6), aluminum (2.2) zinc (1.9), and magnesium (.1). The total casting tonnage in 1956 was 18,000,383 tons.

The light metal segments of the casting industry, comprising only about 5 per cent of the total, are now expanding rapidly, whereas the other portions are static or have receded.

Aluminum, magnesium and zinc castings are the major light metal castings. Of these, aluminum and zinc are by far the most important. Magnesium has specialized and important uses but its volume is as yet relatively small.

Data for aluminum and zinc castings production are given in Table 1. The ratio of total zinc to total aluminum has remained about constant over the years. The ratio of zinc die castings to aluminum die castings has decreased from around five to one in 1946 to about two to one in 1956.

Almost all die castings are made from the light metals; ordinarily none of the heavy metals is used. There are some copper base die castings and some very recent work in steel die castings, but the light metals are the only major die casting materials.

The major portion of the increase in light metal castings production is accounted for by die castings, as shown in Figure 1. Aluminum sand castings have held their own and production of aluminum permanent mold castings has increased slightly over the last few years. The rate of increase in aluminum die castings is somewhat more rapid than that of zinc, although the rate for zinc is still substantial. The absolute value of the increase in the 11 years from 1946 through 1956 was 302 million pounds for aluminum (400 per cent of the 1946 figure) and 312 million pounds for zinc (80 per cent of the 1946 figure); thus the poundage increase is about equally divided between aluminum and zinc.

Table 1

Castings Production in the United States From Aluminum and Zinc
(000 pounds)

	Aluminum			Zinc			Ratio Zinc To Aluminum	
	Total Castings	Die Castings	Per Cent Castings	Total Castings	Die Castings	Per Cent Castings	Total	Die
1946	388,710	73,702	19.0	384,700	375,815	97.6	.97	5.10
1947	467,838	115,644	23.7	445,722	438,693	98.1	.94	3.8
1948	471,616	128,903	27.2	463,118	457,088	98.8	.982	3.8
1949	351,778	98,340	27.9	400,562	397,001	98.8	1.04	4.0
1950	543,082	167,201	30.8	579,332	574,196	99.2	1.06	3.4
1951	550,432	151,465	27.5	494,950	474,937	96.0	.90	3.1
1952	518,978	169,732	32.7	408,352	405,538	99.5	.80	2.4
1953	658,022	239,330	36.3	521,252	515,033	98.8	.80	2.2
1954	624,972	245,291	39.3	520,502	513,945	99.0	.84	2.1
1955	827,162	355,203	43.0	778,000	769,480	98.8	.94	2.2
1956	794,582	376,230	47.3	692,728	687,421	99.2	.87	1.8

Source: 1958 Foundry Marketing Guide, pp. 58 and 53.

Because die casting production is expanding so importantly it holds perhaps the best possibility in the castings field for new plant construction or expansion.

Location of Die Castings Plants

Table 2 gives the location of die casting plants in the U. S. in 1957.[1/] The number of die casting machines in each area was obtained from the American Machinist Inventory of Metalworking Equipment for 1958. The figures are not completely compatible, since the areas were defined differently by each of the quoted sources. Based on number of plants, the Midwest, the New York area and the California area are the centers of die casting production. In these areas are found 60 per cent of the plants and 65 per cent of the die casting machines.

In contrast there are approximately 34 plants (3.2 per cent) in the six state area including Georgia and the surrounding states. This area contains approximately 13 per cent of the population of the United States.

In the Atlanta-New Orleans area the plants average only 1.5 machines per plant compared with a national average of 3.24. In the Richmond area 10 plants have 165 machines--but most of these are concentrated in one plant, with captive production. The average plant in the six state area contains fewer machines than the national average. Moreover, the machines are smaller and have a correspondingly lower annual tonnage production.

The 12 custom die casters listed in the area represent only 2 per cent of the U. S. total. Tonnage production by these plants would be considerably less than 2 per cent of the national total, as the plants are smaller than the national average.

Tables 3 and 4 give the requirements in the U. S. for zinc and aluminum metal used in die castings. In spite of a drop in the per cent of job shop production, both for aluminum and zinc, there has been an absolute increase in each. In fact, poundage production of cutom zinc die castings has approximately doubled in the last decade and custom aluminum die castings have about tripled. The dollar values have risen even more than poundage production because of inflation.

The value of custom die castings shipments by job shop producers in the U. S. for 1957 was $416,500,000. This value excludes the value of die casting dies and special tooling. It also does not include the additional value

1/ American Die Casting Institute figures.

Table 2

Distribution of Die Casting Machines
and Production Plants in the United States

Area	Number of Machines			Per Cent of U. S.	Number of Plants			Per Cent of U. S.	Machines Per Plant
	Hot Chamber	Cold Chamber	Total		Job	Captive	Total		
Boston	115	23	138	4.0	17	24	41	3.8	3.45
Bridgeport-Hartford	28	-	28	.8	13	13	26	2.4	1.18
New York-Newark Buffalo-Syracuse	368	15	383	11.1	87	90	177	16.6	2.16
Philadelphia-Camden Pittsburgh-Wheeling	116	20	136	4.0	20	40	60	5.5	2.27
Baltimore	-	-	-	-	2	5	7	.6	-
Richmond	160	5	165	4.8	2	8	10	.9	16.50
Atlanta-New Orleans	14	32	46	1.3	11	19	30	2.7	1.58
Six State	-	-	-	-	12	22	34	3.2	
Cleveland Toledo Cincinnati-Louisville	320	71	391	11.3	64	36	100	9.4	3.91
Detroit-Indianapolis Chicago	1078	566	1644	47.7	178	125	303	28.5	5.43
Milwaukee Minneapolis-St. Paul	106	9	115	3.3	18	18	36	3.4	3.20
St. Louis Kansas City-Tulsa	104	31	135	3.9	29	21	50	4.7	2.70
Dallas-Houston	-	-	-	-	17	5	22	2.0	-
Denver	16	-	16	.5	12	13	25	2.3	.64
Seattle-Portland	26	24	50	1.4	11	10	21	2.0	2.38
San Francisco-Los Angeles	98	87	185	5.4	99	55	154	14.5	1.19
U. S. TOTAL	2563	883	3446	100.0	579	483	1062	100.0	3.24

Table 3

Special High Grade Zinc Die Castings, 1946-1957
(000 pounds)

Year	For Die Casting Production By			
	Job Shops	Captive Shops	Total	Per Cent Job Shop
1946	288,000	96,000	384,000	75
1947	316,000	105,000	421,000	75
1948	297,000	140,000	437,000	68
1949	232,000	144,000	376,000	62
1950	340,000	194,000	534,000	64
1951	292,000	160,000	452,000	65
1952	266,000	140,000	406,000	65
1953	344,000	168,000	512,000	67
1954	292,000	150,000	442,000	66
1955	550,000	270,000	820,000	67
1956	468,000	257,000	725,000	64
1957	450,000	253,000	703,000	64

Source: American Die Casting Institute, February 1958

Table 4

Primary and Secondary Aluminum Die Castings, 1946-1957
(000 pounds)

Year	For Die Casting Production		Total Die Casting	For Alloying Zinc	Total Aluminum	Per Cent Job Shop
	Job Shops	Captive Shops				
1946	Not Available			Not Available		
1947	91,400	18,000	109,500	16,850	126,350	83
1948	100,250	18,750	119,000	17,600	136,600	84
1949	76,000	12,000	88,000	15,000	103,000	86
1950	127,500	16,500	144,000	21,350	163,350	88
1951	106,000	22,000	128,000	18,000	146,000	83
1952	127,500	28,000	155,500	16,250	171,750	82
1953	185,000	51,000	236,000	20,500	256,750	78
1954	168,000	55,000	223,000	17,800	240,800	76
1955	270,000	82,500	352,500	32,800	385,300	77
1956	262,250	105,000	367,250	29,000	396,250	71
1957	268,750	107,750	376,500	28,200	404,700	71

Source: American Die Casting Institute, February 1958

of sales of plating and other finishing. Such sales and service represent additional dollars billings estimated at over $250 million.

The total of $416,500,000 for custom die casting sales includes $210,000,000 for zinc, $193,500,000 for aluminum and $13,000,000 for magnesium and brass.

The end use distribution of die casting sales is shown in Table 5. Sales to the automotive industry comprise approximately half of the total die casting sales. Industrial and commercial machinery and tools take about 10 per cent, while home appliances use approximately 20 per cent. The three major categories of end users, therefore, consume about 80 per cent of the die castings.

Table 5

End Use Distribution of Die Casting Sales in 1957
(by weight, by metal)

1957 Sales Distribution of Job Shop Produced Die Castings to Wide Customer Industry Groups

KEY	End Use Industry Groups	Zinc		Aluminum		Magnesium		Brass	
		Per Cent of Total	Estimated Pounds	Per Cent of Total	Estimated Pounds	Per Cent of Total	Estimated Pounds	Per Cent of Total	Estimated Pounds 1/
A	Agricultural, Mining Construction Equipment	0.9	4,000,000	3.1	8,250,000	0.1	5,500	1.8	135,000
B	Automotive (Motor Vehicles)	56.9	256,000,000	42.8	115,000,000	37.4	2,000,000	4.8	360,000
C	Other Transportation	1.5	6,750,000	1.2	3,350,000	1.2	65,000	0.5	37,500
D	Industrial, Commercial Machinery and Tools	7.0	31,500,000	12.5	33,500,000	32.3	1,750,000	13.4	1,000,000
E	Electronic Devices & Communications Equipment	1.7	7,750,000	1.1	3,000,000	0.1	6,250	--	--
F	Office Equipment & Business Machines	3.9	17,500,000	7.5	20,000,000	7.7	425,000	0.6	45,000
G	Plumbing, Heating & Builders Hardware	5.1	23,000,000	2.1	5,750,000	--	--	59.8	4,490,000
H	Photographic, Optical, Recording Devices, etc.	2.1	9,500,000	6.1	16,400,000	3.9	215,000	0.5	37,500
K	Timing & Time Operated Devices; Clocks	1.0	4,500,000	1.1	3,000,000	--	--	1.6	120,000
L	Home Appliances	18.3	82,500,000	17.5	47,000,000	4.1	222,500	1.0	75,000
M	Toys, Sporting Goods Personal Goods & Jewelry	0.9	4,000,000	3.0	8,000,000	0.1	5,750	0.2	15,000
N	National Defense	0.7	3,000,000	2.0	5,500,000	13.0	705,000	15.8	1,185,000
	Totals by Metals	100.0	450,000,000	100.0	268,750,000	100.0	5,400,000	100.0	7,500,000

1/ Brass total pounds from government data, distribution from ADCI reports.

Source: Reports of Members to American Die Casting Institute, February, 1958.

Note: Totals represent all job shop sales. Captive use not included.

II. THE AREA MARKET

Preliminary estimates of the market for die castings in the six state area have been made by three different methods. Two of these techniques, estimates by proportion of employees in the six state area and estimates by correlation with manufacturing wages and salaries, are used to obtain order of magnitude figures and an indication of the rate of growth of consumption in the area. The basic data for these two approaches were obtained from trade and Census sources. The third estimate of the market was made by expansion of the results of a questionnaire sent to die casting users in the six state area.

Estimate by Proportion of Employees in the Six State Area

The number of employees in plants located in the six state area and in the nation are compared for selected segments of industries. The segments chosen are three and four digit Census categories, the data for which are given in Iron Age Basic Marketing Data on Metalworking.

The segments used were chosen to be representative of the major consuming groups listed in "End Use Distribution of Custom Die Casting Sales." (See Table 5.)

Table 6 gives the number of plant workers for selected Census code groups. The percentage of total U. S. employees found in the six state area is calculated for each group.

These per cent figures are then used to estimate the sales of zinc and aluminum custom die castings in the six state area by multiplying by national sales. The results are given in Table 7. There are two different figures derived for the automotive category. The first assumes that die casting sales are proportional to employees in the three digit classification (371) "Motor Vehicles and Motor Vehicle Equipment." This classification, however, is dominated by the auto assembly plants, of which there are several in the area. The assembly plants, in general, purchase subassemblies containing castings rather than castings as such. At the present time, these subassemblies are mostly shipped into the six state area assembly plants from outside the area. If the subassemblies were made in the area the figure would be valid, and it therefore gives an indication of the volume of die casting business that may be expected as the manufacturers of subassemblies move into the area. Until this happens the ratio obtained from the four digit

Table 6

Concentration of Four Major Consumers of Custom Die Castings
in Six State Area, 1957 in Plants Employing 20 or More

	Number of Plant Workers								
	United States	Alabama	Florida	Georgia	North Carolina	South Carolina	Tennessee	Total Six State	Six State as Per Cent of U. S.
Automotive									
371, Motor Vehicle and Equipment for	700,416	1,678	230	6,751	1,154	96	2,465	12,373	1.77%
3714, Motor Vehicle Parts and Accessories	312,495	700	60	400	475	-	314	1,949	.62%
3729, Aircraft Parts and Sub-Assemblies	93,591	-	880	-	-	-	-	880	.94%
Home Appliances									
363, Household Appliances	159,977	670	112	289	425	-	4,908	6,404	4.00%
Industrial Commercial Machinery and Tools - Total	801,346	2,055	1,816	4,849	5,984	1,896	4,024	20,642	2.58%
353, Construction, Mining Material, Hand Equipment	182,624	560	241	1,473	167	78	1,382	3,901	
354, Metalworking Machinery and Equipment	238,430	45	101	227	308		175	856	
355, Special Industry Machinery	144,558	1,241	549	1,889	4,011	1,624	790	10,104	
356, General Industry Machinery and Equipment	193,991	73	715	1,170	890	80	1,225	4,153	
359, Miscellaneous Machinery	41,743	163	210	90	608	114	470	1,628	
Office and Business Machines	172,679	271	106	528	515	60	530	2,010	1.16%
357, Office Computing Accounting and Store Machines	94,060	-	48	22	90	20	-	180	
358, Service Industry Machines	61,456	271	58	506	425	40	530	1,830	

Source: Iron Age Basic Marketing Data

Table 7

Estimate of Custom Die Casting Consumption in the Six State Area 1957
by Four Major Consumer Groups

	Casting Sales U. S. (000 lbs.)		No. Employees U. S.	No. Employees Six State	Six State as Per Cent of U. S.	Sales Estimate Six States (000 lbs.)		
	Zinc	Aluminum				Zinc	Aluminum	Total
Automotive	256,000	115,000						
371, Motor Vehicles and Equipment for			700,416	12,373	1.77	4,531	2,036	6,567
3714, Motor Vehicles, Parts and Accessories			312,495	1,949	.62	1,587	713	2,300
Home Appliances	82,500	47,000						
363, Household Appliances			159,977	6,404	4.00	3,300	1,880	5,180
Industrial Commercial Machinery and Tools	31,500	33,500						
353, 354, 355, 356, 359			801,346	20,642	2.58	813	864	1,677
Office and Business Machines	17,500	22,000						
357, 358			172,679	2,010	1.16	203	232	435
	387,500	215,500				8,847	5,012	13,859
						5,903	3,689	9,592

(1957 SIC)

classification (3714) "Motor Vehicle Parts and Accessories" should be used to give an indication of present consumption.

If these segments represent 80.3 per cent of total custom die castings consumption in the six state area, which is the ratio in the U. S., then the total custom figure (based on 9.59 million pounds) is 12.0 million pounds. This is 2 per cent of the national total of 603 million pounds of custom aluminum and zinc die castings in 1957.

The estimated 12.0 million pounds of custom die castings in the six state area might be valued at a figure of $1,100 per ton to give a total of about $7 million dollars, of which $2 1/2 million is aluminum.

Estimate by Correlation of Manufacturing Wages and Salaries

The market for aluminum castings of all types in the six state area (Georgia and the surrounding states) has been estimated by statistical methods in the process of preparing a report on light metal castings.[1/] From these data the market for custom aluminum die casting can be estimated. (See Table 8.) At the present time sales of aluminum die castings are indicated at $4.83 million in the six state area. The forecast is for $11.98 million by 1965.

These estimates are conservative. They have been adjusted for industry mix. That is, the Southeast does not have the same proportion of castings consuming industries as the proportion found in other, more industrialized sections. Specifically, Georgia's 1957 "industry mix index" is 59.1 and the index for the states is 34.8, compared to 100 for the U. S. Thus, if southern industrialization advances to equal the mix of casting consuming industries of the U. S., the consumption of castings will be about doubled. Furthermore, such a development is actually taking place. Ten years earlier (1947), Georgia's mix index was only 23.4, while the six states stood at 19.7. The trend is toward a richer mix.

Estimate by Mail Questionnaire[2/]

Questionnaires were mailed to a total of some 700 metalworking plants in the six state area listed by the Census of Manufacturers as consumers of

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1/ "Light Metal Castings: A Manufacturing Opportunity in Georgia," Industrial Development Branch, Engineering Experiment Station, Georgia Institute of Technology, December 1959.

2/ Op. cit. Refer to Appendix with questionnaire.

Table 8

Die Casting Consumption in the Six State Area

Year	Total Aluminum Castings Consumption (Million Dollars)	Per Cent Custom Die Casting	Custom Aluminum Die Casting (Million Dollars)
1946	$ 3.39	N.A. %	$ N.A.
1947	3.86	20	0.77
1948	4.48	24	1.08
1949	4.58	25	1.15
1950	4.50	25	1.12
1951	5.67	23	1.30
1952	6.94	25	1.74
1953	8.19	28	2.29
1954	9.64	28	2.70
1955	10.77	32	3.45
1956	12.37	33	4.08
1957	13.81	35	4.83
Forecast			
1960	16.96	35	5.94
1965	24.84	35	8.69
1970	34.22	35	11.98
1975	45.08	35	15.78

Sources: Facts for Industry
1954 U. S. Census of Manufacturing
Industrial Development Branch Analysis

aluminum castings. This first general questionnaire was followed later by a specific questionnaire on die casting consumption. The second mailing went to about 280 firms, including all the known users of die castings, as well as firms suspected of using die castings that had not responded to the first questionnaire.

From the total of 700 questionnaires 220 replies were received. Of these, 80 turned out to be light metal castings users, and 40 of these 80 die casting users. The number of plants and workers in Census four digit groups containing the known users are listed in Table 9. The consumption figures, which are the result of the expansion of data from the questionnaires, were calculated by assuming that the non-respondents were similar in characteristics to the respondents.

The total (custom plus captive) estimated value of $6 million appears to be a conservative one. Of this $6 million, a little over $4 million is custom casting.

This amount does not include values consumed by code 3442 (Metal Doors), as only three out of 39 plants responded. The indicated half million dollars in custom castings consumed by these three plants would indicate a several million dollar market in this special field alone.

Comparison of Estimates

The estimated dollar values obtained by each of the three estimating methods are given in Table 10. It is evident that each of the techniques has some deficiencies.

The questionnaire covered only the metalworking industries and thus did not include some consumer goods industries. Its estimate therefore would be expected to be low. The estimate of zinc consumption would be much higher if the consumption of the metal doors, sash and trim group had been determined.

The correlation with manufacturing wages and salaries gives only the figures for aluminum die castings. The increase of about a half million dollars per year for aluminum would probably indicate a total increase per year of better than $1 million for all custom die castings in the six state area. With such a trend existing the area could support a sizable new plant just on new business.

Table 9

Selected Consumers of Die Castings
Six State Area, 1959

Sic Code	Industry Description	Number of Plants	Number of Workers	Estimated Die Castings Consumption Aluminum	Magnesium	Zinc
3429	Hardware	13	1,924	$ 40,640		$1,651,000
3442	Metal Doors, Sash, Trim	39	3,569	2,300		See below
3452	Bolts, Nuts, etc.	3	478	2,300		
3461	Stampings	17	2,037	262,500		80,300
3494	Valves and Fittings	5	2,386	15,700		
3522	Farm Mach. & Tractors	29	3,106	111,000		8,800
3552	Textile Machinery	66	5,889	424,000		313,000
3564	Blowers & Vent Fans	6	300	44,100		
3566	Power Trans. Equip.	12	1,248	52,000		
3571	Computing Mach., etc.	5	48	27,400		
3589	Other Service Ind. Mach.	10	530	900		8,400
3611	Elec. Meas. & Test Instr.	4	1,363	424,000		
3631	Major Hsld. & Cook Equip.	17	4,182			8,800
3642	Lighting Fixtures	7	854	42,100		
3644	Non Current Wire Dev.	6	1,148	61,900		
3661	Tel. & Tel. Equip.	2	1,444	1,800,000	$360,000	
3662	Radio & TV Trans.	8	365	101,000		
3679	Elec. Comp. NEC	10	2,560	118,400	277,500	
3721	Aircraft	3	17,166			7,200
3729	Aircraft Parts & Sub A.	6	940	2,800		
3811	Lab. Scien. & Eng. Instru.	2	109	6,400		
		Total Value				
	Totals	$6,252,640		$3,537,640	$637,500	$2,078,000
	Less Captive	2,128,600		313,000	None	1,815,600
	Custom Casting	4,124,040		3,224,140	637,500	262,400

2442 Metal Doors (Zinc Die Castings Only)

	Plants	Workers	Total	Captive	Custom
Responses	3	359	$724,000	$150,000	$575,000

Table 10

Comparison of Dollar Values of Custom Die Casting Consumed in the Six State Area Derived by Three Different Methods (000 dollars)

	Aluminum	Magnesium	Zinc	Total
Mail Questionnaire 1959	$3,224	$637	$262 (Plus)	$4,124
Correlation of manufacturing wages and salaries				
1955	3,450			
1956	4,080			
1957	4,830			
1960	5,940			
Estimate by proportion of employees in census groups	$2,500		$4,500	$7,000

The estimate by per cent of employees in Census groups emphasizes zinc casting consumption probably more than is warranted because the national ratio of aluminum to zinc is used.

From the above analysis, a consumption of custom die castings in the six state area of between $5 million and $10 million is indicated.

Table 11 presents a partial list of items made by manufacturers who use die castings in the six state area.

Table 11

A Partial List of Items Made by Manufacturers
Who Use Die Castings in the Six State Area

Furniture Hardware	Water Conditioners
Locks and Building Hardware	Watt Hour Meters
Aluminum Windows	Stoves
Aluminum Awning Windows	Low Pressure Fans
Electrical Enclosures	Flourescent Light Fixtures
Valves	Electrical Equipment
Cotton Pickers	Áirline Food Serving Equipment
Garden Tractors and Power Mowers	Door Bells, Chimes and Transformers
Power Lawn Mowers	Magnetic Recording Tape
Textile Machine Parts	Aircraft Modification
Air Circulation Appliances	Electronic Equipment
Gears and Machine Parts	Guided Missile Equipment
Tape Perforators and Readers	Government Electrical Equipment
Kitchen Equipment	Surveying Instruments

III. THE PRESENT SUPPLIERS IN THE SIX STATE AREA

A list of custom die casting plants in the six state area (Table 12) reveals that some very excellent suppliers exist here at the present time.

It is certainly possible that one or more of these might expand to fill the gaps developing in the supply of die castings to the area at the present time.

Table 12

Custom Die Casting Facilities in the Six State Area

Company Name & Address	Number of Employees	Cold Chamber		Hot Chamber	Machines & Services
Alabama					
Acton Hopkins Machine & Foundry Company 2615 2nd Avenue, N. Birmingham 3, Alabama Paul C. Acton	15-20	1-100			1,2,5,6
Metal Cast Company 620 16th Avenue, W. Birmingham 4, Alabama R. D. Beason	10	2-200 1-400		1-30 1-200	1,2,5,6
Florida					
Allied Die Casting Corp. of Florida 7080 N. W. 37th Court Hialeah, Florida					
Airtronics International Corporation 2051 West Ninth Avenue Hialeah, Florida					
Die Casting Corp. of Fla. 3000 N. W. 75th Street Miami, Florida R. L. Wood	10	x	2-25 2-60 2-100	x	2
Industrial Die Casting & Manufacturing Co. 2980 N. W. 22nd Street Miami, Florida		x		x	2
Ruffe, Inc. 7525 N. W. 37th Avenue Miami, Florida		x			1,2,3,4, 5,6
K. E. Schoell Company 764 N. W. 75th Street Miami, Florida				x	2
Universal Die Casting Corporation 3500 N. W. 59th Street Miami, Florida	75	x	5-200 2-600	x	1,2,5,6, 7

Table 12 (Continued)

Custom Die Casting Facilities in the Six State Area

Company Name & Address	Number of Employees	Cold Chamber	Hot Chamber	Machines & Services
Southern Die Casting Corporation 13121 South Dixie Hwy. Miami, Florida Alex L. Homery			x	2,3
Ludman Corporation 14100 Biscayne Blvd. North Miami, Florida		x	x	1,2,4,6
Bolam Copper Company 2801 Jefferson Street Tampa, Florida				
GEORGIA				
Meadows Manufacturing Co. 1190 Aster Avenue, S. W. P. O. Box 296 A Atlanta, Georgia	100			
Whitehead Die Casting Co. 1140 Zonolite Road, N. E. Atlanta, Georgia Richard K. Whitehead	50	1-80 1-175	1-16	2,5,7
Industrial Foundries, Inc. 164 Watson Street P. O. Box 57 Carrollton, Georgia L. C. McMillan	45	1-80	1-60	5,6,7
Macon Mold Company P. O. Box 730 Macon, Georgia	8			5
Southern Industrial Die Casting Company Tifton Highway P. O. Box 21 Moultrie, Georgia Charles E. Boaz	25	8	2	2

Table 12 (Continued)

Custom Die Casting Facilities in the Six State Area

Company Name & Address	Number of Employees	Cold Chamber	Hot Chamber	Machines & Services
NORTH CAROLINA				
Dixie Die Casting Corporation P. O. Box 1208 Reidsville, N. C.	40	1-100 1-300 1-400 1-500	1-25	2,5
TENNESSEE				
Harsco Corporation Springfield, Tennessee	250+			

NOTES: Machines & Services

1. Assembling
2. Tooling & Dies
3. Electroplating
4. Spectrochemical inspection
5. Machining
6. Painting
7. Other